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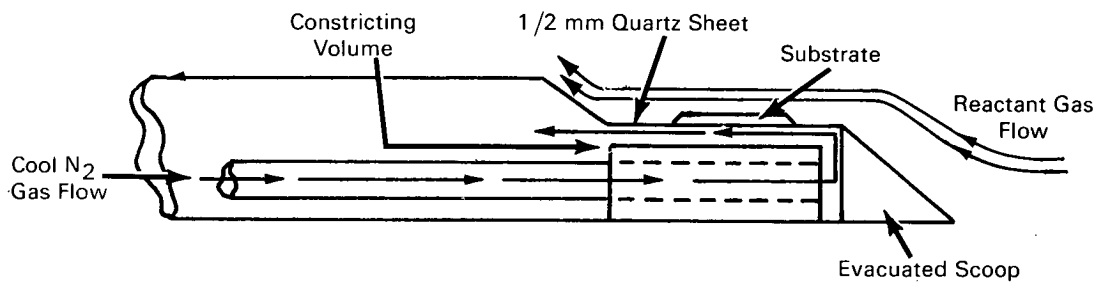
Brief 69-10732

NASA TECH BRIEF

Controlled Substrate Cooling Improves Reproducibility of Vapor Deposited Semiconductor Composites



The problem:

During epitaxial vapor deposition of compound semiconductor structures (layers of different chemical composition) in a carefully controlled flow system, temperature gradients in the substrate and deposition zone degrade product quality. These gradients produce inhomogeneous structures resulting in devices with inconsistently reproducible properties.

The solution:

An improved substrate holder which preferentially provides more uniform substrate cooling and increases the proportion of vapor flowing over the substrate during growth.

How it's done:

As shown in the sketch, the interior of the substrate holder constricts the cool nitrogen gas flow to the flat volume immediately beneath the substrate, thus preferentially and uniformly cooling the substrate. The evacuated scoop forces a greater percentage of reactant gas to flow smoothly over the substrate. An evacuated scoop minimizes dopant deposition on the scoop end. This design speeds uniform growth of deposited layers and eliminates compositional grading.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Electronics Research Center
575 Technology Square
Cambridge, Massachusetts 02139
Reference: B69-10732

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546

Source: J. Tietjen, R. Clough, and D. Richmen of Radio Corporation of America under contract to Electronics Research Center (ERC-10161)

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